REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

In response to the rejection of claims 1, 3-6, 8-12, 14-17, 19, 27 and 29-31 under 35 U.S.C. §112, second paragraph, the claims have been amended above so as to avoid use of the word "attempting," thus mooting this ground of rejection.

Accordingly, all outstanding formal issues are now believed to have been resolved in the applicant's favor.

The rejection of claims 1, 3-6, 8-12, 14-17, 19, 27 and 29-31 under 35 U.S.C. §103 as allegedly being made "obvious" based on Gregerson '351 in view of O'Toole '273 is respectfully traversed.

The claims have been amended above in an attempt to even more clearly recite the node-joining rules which govern the applicant's claimed method/apparatus in order to ensure that each node has a maximum of k connections and where peripheral nodes are not allowed to have fewer connections than the more central nodes in the network.

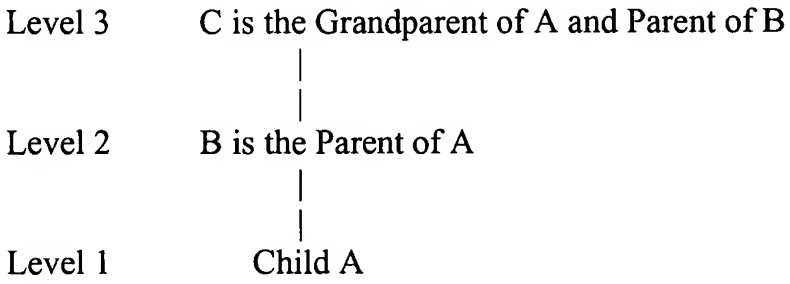
In brief summary, the applicant's invention seeks to maintain an orderly growth of a network by requiring certain minimum and maximum connections between network nodes within and between hierarchical levels of the network.

By contrast, Gregerson simply tries to ensure that every node in the network can communicate with every other node in the network, such that an arbitrary number of identical (semantically equivalent) instances, i.e., kernels, are linked together to form a logical tree. As new resources join (or rejoin) the network, the kernel residing at each node and thus each resource connected to that node, automatically and immediately becomes accessible to all applications using the system. See, for example, the "summary of the invention" section from 2:50 – 3:30. Gregerson gives no guidance of any form of connection rules that would in any way minimize or maximize the number of interconnections made between nodes. Instead, Gregerson seems to simply accept the possibility that all nodes are interconnected to one another and then sets about describing the nodal relationships that exist in any arbitrary network at some point in time – no matter how arbitrary and complex the network actually may be in terms of internodal connections. As will be explained in more detail below, such an unorganized, arbitrary addition of nodes to an existing network is not a very good idea – and it in no way teaches or suggests the applicant's claimed invention.

Similarly, O'Toole is simply directed toward maintaining a map of node relationships for a given network – without addressing any particular rule set for constraining ungainly, arbitrary growth in the network.

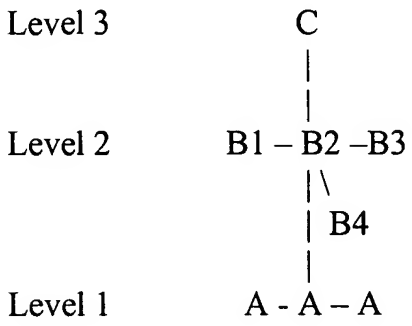
A "kernel" in Gregerson at level n (where the level can be normal, area, group, domain and network) is termed to be a child of its parent kernel at level n+1 provided that the two kernels have the same level above n. For example, a kernel at the normal level is the child of a kernel at the area level if the parent of the area level (i.e., at the group level) is the grandparent of the kernel at the area level.

This is trivial in the simplest scenario, e.g., if the levels have the following topology:



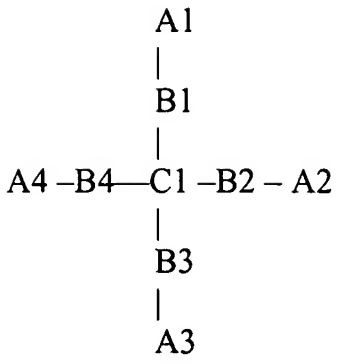
With all due respect, this cannot possibly anticipate or suggest "initiating and maintaining a specified number of k-1 further secondary connections between the node and other nodes in the network having the same level in the hierarchy as the node."

i.e., as within *each level*, each node must maintain the same number of secondary connections with other nodes at the same level. Nor would the following be allowed by applicant's invention:

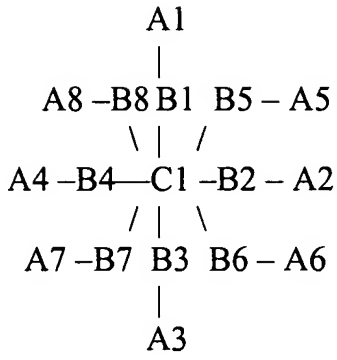


As here there are different numbers of secondary connections at each level.

Networks are not static structures, but evolve. It is extremely useful if they grow in a stable manner which scales suitably their technical characteristics. Consider a small network in which new nodes (A) are only connected to a node if that node (B) is connected to the root node (C) and has no other "A" nodes connected. When the network is small and comprises just nine nodes, i.e., as follows in the sketch below, the topology and connection rules are sufficient to ensure C is not too congested:

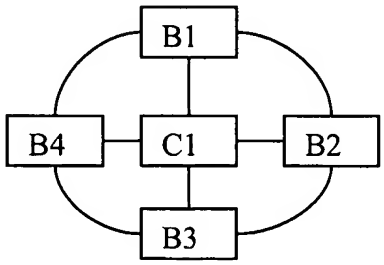


However, if, another four B nodes and another four A nodes were to join the network:

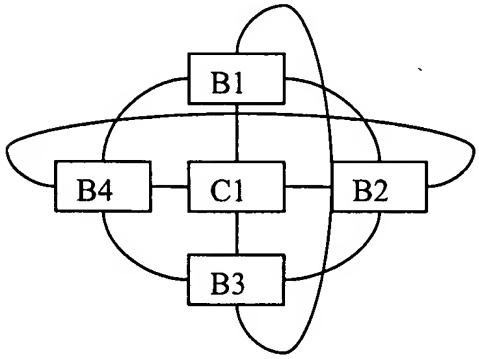


Node C1 now has potentially double the traffic through it and is more likely to be congested – if in fact the network grew and 100 B nodes were added, but only connected to C1, the root node C1 would be so congested that the network would probably not function. This type of network is not scalable. To control how networks grow, one needs connection rules.

The applicant's invention seeks to address this type of problem by constraining how nodes joining a network connect to nodes already in the network.



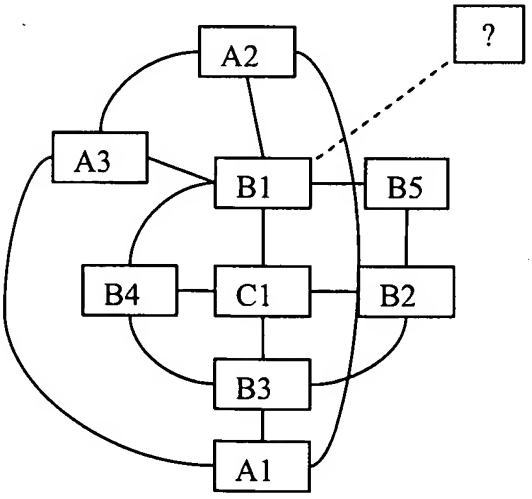
(a) Two secondary connections per node



(b) Three secondary connections per node

In the above example, new nodes must form secondary connects to nodes at the same level as they are when they join the network. Here the number of secondary connections which must be formed at (a) is just two, whereas the number of secondary connections which must be formed at (b) is three. So here instead of each node B1...B4

instead of each node B1...B4 being just connected to C1, they must also form secondary connections to the other nodes at the same level of the network – i.e., they connect to their neighbors at that level to form the secondary connections. This provides a more scalable network topology as C1 does not need to become more congested as the network topology grows. To provide a scalable network, the invention applies the same constraint at all levels of the network.



Consider for ease of explanation the above example where another node B5 has joined the network at level 2, along with three A nodes – A1, A2 and A3. Consider that this is the state of the network before a new node "A4" joins at point "?". If A4 is to form a primary connection to B1, the question is what other connections should A form?

a subset of nodes in a network – other nodes may be connected to the nodes shown but not used in the relevant processes (the roll call in Fig. 9 and the election communication between different nodes in Fig. 14).

O'Toole teaches that nodes in a network can change their relationship, and if a node moves in the network the root receives a termination or creation signal that represents change information and uses this change information to update the root's map of the network.

Thus, neither cited prior art document provides node connection rules for network growth which dictate what kinds of connection(s) a node is to form when it joins a network.

Gregerson does not teach any connection rules – it simply indicates what to call a node once it is already connected to the network and what to do to resolve any conflicts once a node has joined the network in terms of the domain of a node. In other words, Gregerson teaches that by forming a primary connection to B1, since B1's parent is C1, the new "A4" node will be the child of B1. Gregerson also teaches in Fig. 9 the roll call process in which a kernel queries the network to find out vacancies in the names space hierarchy.

However, Gregerson does not say what rules to apply to nodes joining the network. A particular set of messages and nodes are shown in Fig. 9 of Gregerson, but again nothing teaches what connections a new node is to form when attaching to the network – it is instead assumed that these connections must be present, but it is quite possible for other connections to be provided.

In other words, Fig. 9 is just an example of a particular network topology (and may not be complete as, of course, nothing in Gregerson indicates these are the only connections for those nodes – it is just showing the minimum number of connections between nodes for the messaging required to be accomplished).

In short, nothing in Gregerson teaches a person of ordinary skill in the art to establish rules for connecting a node to the network topology in a scalable manner. Similarly, Fig. 14 of Gregerson shows the election process for determining the controlling node in the case where two nodes have role conflicts. Nothing shown in Fig. 14 teaches what kinds of connection a node joining a network is to form.

Similarly, nothing in O'Toole teaches what kind of connections the new node A4 should form. In fact, all O'Toole teaches is how to maintain a map of the relationships that do exist. It does not teach rules for controlling the relationships that are formed. The connection and termination in O'Toole are just to show what connections are mapped between nodes which have been connected to the network and how to connect/terminate

changes to the network and not what kinds of connections the nodes themselves should form when they join the network.

There is a great difference between mapping and dealing with whatever connections a node has somehow formed in a network, and configuring a node so that it can only connect in a certain way to a network by arranging the node for use in a particular type of network in which the given connection nodes operate according to the invention (see 6:15-17 and 8:18-30 of the specification).

Accordingly, this entire application is now believed to be in allowable condition, and a formal notice to that effect is respectfully solicited.

Respectfully submitted,

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